

NEW RECORDS OF WESTERN TRICHOPTERA WITH NOTES ON THEIR BIOLOGY¹

Bernard G. Swegman² and Leonard C. Ferrington, Jr.

ABSTRACT.— Western records for 27 species of Trichoptera are given: a majority of the records are from the Beartooth Mountains of northwestern Wyoming. In addition, examples of variation in the male genitalia of *Limnephilus coloradensis* (Banks) are figured and the female is described. Some comments regarding the larvae of *Allomyia* (*Imania*) are presented.

Twenty-two species of Trichoptera are reported from Wyoming and Montana, including 20 from the immediate vicinity of the Beartooth Mountains, where the University of Pittsburgh's Pymatuning Laboratory of Ecology has offered a summer field course in Alpine Ecology. In addition, 7 species were collected near a pond at the Winding River Campground near Rocky Mountain National Park, Grand County, Colorado. Within the Beartooth Mountains, immatures of many common limnephilid genera were collected, but the species remain unknown to us. Some of the more common genera taken include: *Discomoeucus*, *Hesperophylax*, *Homophylax*, *Lenarchus*, *Limnephilus*, and *Psychoglypha*.

Considerable variability was observed in the male genitalia of *Limnephilus coloradensis* (Banks). Examples of this variation are illustrated. Further, *in copula* specimens of this species were collected, thereby making possible the identification of the female that is described and figured.

COLLECTING SITES

The following sites, with the exception of the Grow Ventre and Winding River locations, are within the Beartooth Mountains of the Absaroka range of northwestern (Park Co.) Wyoming. The Star Lake site lies in Park Co., Montana.

Inlet Run.— Elevation approximately 3140 m, 109° 29' W, 44° 58' N. The sample site is on the more easterly of two first order, snow melt streams that flow into Frozen Lake. A majority of the specimens were collected during a series of diel drift studies; however,

occasional specimens were collected by sweeping low vegetation or were picked from rocks.

Frozen Lake.— Elevation 3070 m; same location as above. Specimens were collected by sweeping vegetation or were collected from rocks in 1 m or less of water.

Chain Lakes.— Elevation 2880 m, 109° 31' W, 44° 55' N. The sample site was at the southeast shore of lower Chain Lake near the point where the stream draining Fantan Lake enters. An extensive alpine meadow surrounds the lake.

Sawtooth Lake.— Elevation 2835 m, 109° 28' W, 44° 54' N. The sampling site was on an unnamed second order stream that drains the western slope of Sawtooth Mountain. This stream drains open alpine meadow and flows into the eastern edge of Sawtooth Lake. The specimens were collected from exposed and submerged rocks.

Beartooth Butte.— Elevation approximately 2910 m, 109° 37' W, 45° 57' N. The sample site is a large spring that originates on the south face of Beartooth Butte at the base of an open talus slope. The stream flows through open meadow and enters Beartooth Lake on its western shore at approximately 2710 m elevation.

Moose Bog.— Elevation 2740 m, 109° 37' W, 44° 56' N. This bog is approximately 30 m south of U.S. Route 212, just east of the point where the gravel road to Clay Butte lookout station begins. The specimens were collected by sweeping the bog vegetation on the Sphagnum mat near the largest area of open water.

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²University of Pittsburgh and Pymatuning Laboratory of Ecology, Pittsburgh, Pennsylvania 15260.

Ghost Creek.— Elevation 2650 m, 109° 37' W, 44° 56' N. The sample site was near the point where the gravel road to the University of Pittsburgh's research trailer crosses the stream. The stream is second order and drains intermittent patches of alpine meadows and coniferous forest. Most specimens were collected during diel drift studies; however, some specimens were taken by sweeping vegetation.

Clark's Fork of Yellowstone River.— Elevation 2060 m, 209° 41' W, 44° 51' N. The river at this point is fifth order and flows southeast, draining mixed coniferous forest and pasture lands.

Star Lake.— Elevation 2940 m, 109° 55' W, 45° 6' N. The sample site was located in the stream just east of the outlet from Star Lake. The stream width is approximately 2 m at this point. This site is located in Montana.

Gros Ventre.— Elevation 1980 m, 110° 40' W, 43° 36' N. The sample site was located in Gros Ventre Campground approximately 15 miles northeast of Jackson Hole, Wyoming. The specimens were picked from the windows of the campground restrooms.

Winding River.— Elevation 2590 m, 105° 53' W, 40° 16' N. This sample site was located just west of the entrance to Rocky Mountain National Park, Colorado, in the Winding River Campground. Specimens were collected by sweeping the emergent vegetation of a small pond and were picked from the windows of the campground restrooms.

SPECIES COLLECTED

Rhyacophilidae

Since less than 10 percent of the western *Rhyacophila* immatures are known (Flint, *in litt.*), the following identifications are only tentative. All identifications are based on our use of Smith (1968).

Rhyacophila acropedes Banks.— Wyoming (Park Co.): Ghost Creek, 14 August 1974, 10 larvae, and 15 August 1974, 7 larvae, collected L. Ferrington. 15 August 1974, 1 larva, collected G. Goetz.

Rhyacophila hyalinata Banks.— Wyoming (Park Co.): Ghost Creek, 19 August 1977, 3 larvae, collected D. Ferrington. The ventral surface of the head in these specimens is

darkened, but on the basis of distribution are assigned to *hyalinata* rather than *vocala* (Smith 1968).

Rhyacophila tucula Ross.— Wyoming (Park Co.): Ghost Creek, 14 August 1974, 1 larva, 26 August 1978, 11 larvae, 19 August 1977, 3 prepupae. Sawtooth Lake vicinity, 23 July 1975, 1 larva; Inlet Run, 21 July 1978, 1 larva. Montana (Park Co.): Outlet of Star Lake, 25 July 1975, 4 larvae. All by D. and L. Ferrington.

Rhyacophila vaccua Milne.— Wyoming (Park Co.): Sawtooth Lake vicinity, 23 July 1975, 2 larvae, D. Ferrington.

Rhyacophila vagrita Milne.— Wyoming (Park Co.): Ghost Creek, 14 August 1974, 1 larva, L. Ferrington.

Rhyacophila verulla Milne.— Wyoming (Park Co.): Ghost Creek, 26 August 1978, 2 larvae, 19 August 1977, 1 larva; Sawtooth Lake vicinity, 23 July 1975, 4 larvae; Inlet Run, 21 July 1978, 1 larva. Montana (Park Co.): Outlet of Star Lake, 25 July 1975, 1 larva. All by D. and L. Ferrington.

Glossosomatidae

Glossoma velona Ross.— Colorado (Grand Co.): Winding River Campground, 2 August 1978, 1 male, collected D. Ferrington.

Hydropsychidae

Arctopsyche grandis Banks.— Wyoming (Park Co.): Clark's Fork Yellowstone River, 23 July 1978, 22 larvae, 6 pupae (1 pharate male), 6 males, D. Ferrington.

Hydropsyche oslari Banks.— Wyoming (Teton Co.): Gros Ventre Campground, 29 July 1978, 4 males, 26 females, D. Ferrington.

Hydroptilidae

Stactobiella delira Ross.— Colorado (Grand Co.): Winding River Campground, 2 August 1978, 2 males, 1 female, D. Ferrington.

Limnephilidae

Anabolia bimaculata Walker.— Colorado (Grand Co.): Winding River Campground, 2 August 1978, 1 male, D. Ferrington.

Chyranda centralis Banks.— Wyoming (Park Co.): Ghost Creek, 27 July 1978, 1 female, collected L. Ferrington, identified A. Nimmo.

Dicosmoecus gilvipes Hagen.— Wyoming (Park Co.): Spring at base of Beartooth Butte, 15 August 1974, 1 female, G. Goetz. Unidentified larvae of *Dicosmoecus* have also been collected in large numbers from Inlet Run.

Ecclisomyia conspersa Banks.— Wyoming (Park Co.): Inlet Run, 22 July 1978, 1 male, L. Ferrington.

Ecclisomyia maculosa Banks.— Wyoming (Park Co.): Spring at base of Beartooth Butte, 15 August 1974, 4 pupae (2 pharate males, 2 females), G. Goetz; Ghost Creek, 26 July 1978, 3 males, 27 July 1978, 3 males, 4 females, L. Ferrington. Frozen Lake vicinity, 22 July 1978, 43 larvae, D. Ferrington. The larval records are a tentative assignment based on proximity of sites where adults were taken. However, the single record of *E. conspersa* indicates two species occur in this area.

Allomyia bifosa (Ross).— Wyoming (Park Co.): Inlet Run, 21–22 July 1978, 13 males, 2 females, 69 pupae (51 pharate males, 18 pharate females). In addition to these adult-pupal records, larval records of *Allomyia* include: Ghost Creek, 14 August 1974, 1 larva, G. Goetz, 14 August 1974, 8 larvae, and 15

August 1974, 1 larva, L. Ferrington, 18 August 1977, 2 larvae, R. Seward, 19 August 1977, 5 larvae, and 26 August 1978, 1 larva, L. Ferrington; Inlet Run, 10–11 August 1977, 89 larvae, 17–18 August 1977, 31 larvae, 21 July 1978, 4 larvae, all by L. Ferrington. Two types of larvae were present in these collections. One type is without the flattened head and pronounced carina, as in *Allomyia* (*Imania*) *scotti* Wiggins (Wiggins 1977, Fig. 10.28). The second type has this character and also possesses single gills dorsally and ventrally on segments 2, 3, 4, and 5. Wiggins (pers. comm.) suggests that two species are involved. He has associated gilled larvae with *Allomyia tripunctata* Banks, which is known from Wyoming. Adults of *A. tripunctata*, however, have yet to be collected in the Beartooth Mountains. These gilled larvae were compared to gilled larvae of *Allomyia* collected 17 July 1975 at St. Vrain Creek above Peaceful Valley, Boulder County, Colorado by Dr. J. V. Ward. The specimens from the two localities appear to be distinct, suggesting that at least two species of *Allomyia* in this area possess gills.

Limnephilus coloradensis (Banks).— Wyoming (Park Co.): Ghost Creek, 19 August 1977, 1 male, 1 female, and 1 pair *in copula*, D. Ferrington, Moose Bog, 9 August 1979, 10 males, 1 female, L. Brooks, 26

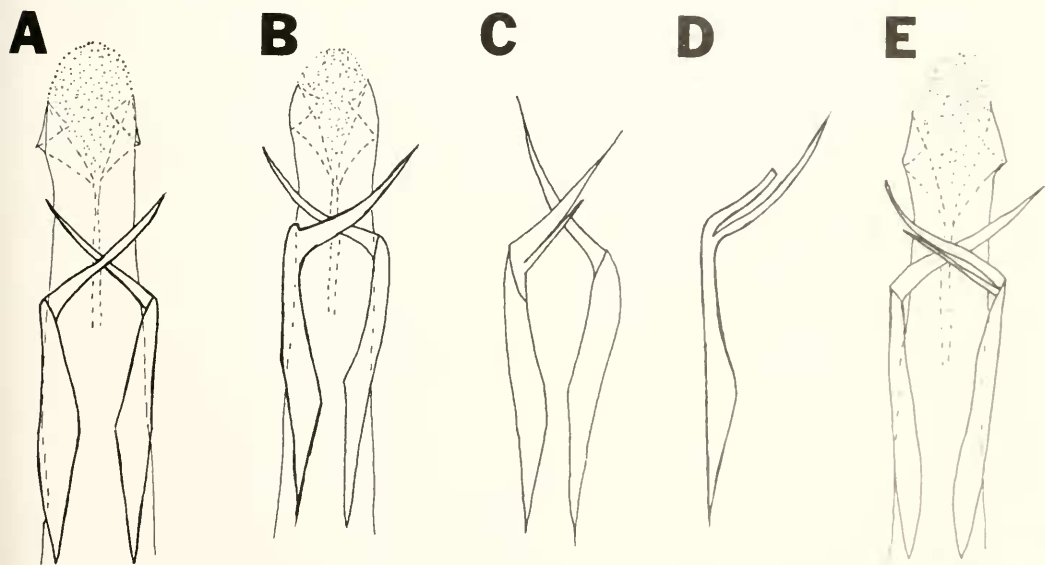


Fig. 1. Variation in the paramer (Lateral appendages sensu Ross 1938) of *Limnephilus coloradensis* (Banks). A—typical symmetrical structure, B–E. Variation in paramer showing auxiliary spines.

males, 39 females, C. Sirianni. Considerable variation in the male genitalia occurs in this species (Figs. 1A-E). The simplest type and probably the most common form (Fig. 1A) is somewhat different from the lectotype figured by Ross (Ross 1938, Fig. 76). Many specimens also possess auxiliary spines (Fig. 1B-E) not unlike *Limnephilus kennicotti* Banks. However, all types will key easily to *L. coloradensis* in Ross and Merkley (1952). In copula specimens have made possible the correct association of the female. The original description of the male is given by Banks (1899).

Description of female: Forewing length 7-8 mm. Hindwing 6-7 mm. Hindwings clear. Forewings with brown irregular patches at stigma, distally between R_4 and M_2 and in costal area between M_2 and Cu_{1a} . Smaller patches in discoidal and thyridial areas, and along A_1 . Female genitalia as in Figures 2A-B. Tergite 9 small. Sternum 9 ventrally divided into two distinct somewhat circular lobes, roundly triangular when viewed laterally. Segment 10 reduced to a ventral flap. Appendages of segment 10 greatly enlarged, produced to points. Supragenital plate rectangular. Median lobe of vulval scale rounded apically, lateral lobes quadrate, produced laterad.

In general, the female bears some resemblance to *Limnephilus kennicotti* Banks. Both

species were placed in the *fenestratus* group by Schmid (1955). In *L. kennicotti* the dorsal body of segment 9 is indistinguishable from segment 10 (see Nimmo 1971, Figs. 419, 420). In *L. coloradensis* the dorsal lobe of segment 9 is distinct. In both species the appendages of segment 10 are greatly enlarged and produced to points distally. These appendages show considerable variation in *L. coloradensis*. In both species the supragenital plate is rectangular. The lateral lobes of the vulval scale is more quadrate in *L. coloradensis*.

Limnephilus hageni Banks.— Colorado (Grand Co.): Winding River Campground, 2 August 1978, 2 males, D. Ferrington. Wyoming (Park Co.): Moose Bog, 18 August 1977, 4 females, collected L. Ferrington, females identified A. Nimmo.

Limnephilus indivisus Walker.— Wyoming (Park Co.): Moose Bog, 9 August 1979, 1 female, C. Sirianni.

Limnephilus janus Ross.— Colorado (Grand Co.): Winding River Campground, 2 August 1978, 10 males, 8 females, D. and L. Ferrington.

Limnephilus picturatus McLachlan.— Wyoming (Park Co.): Moose Bog, 6 August 1977, 25 males, 22 females, 18 August 1977, 4 females, 1 female, L. and D. Ferrington, 9 August 1979, 33 males, 24 females, L. Brooks, 53 males, 66 females, C. Sirianni. Chain Lakes, 12 August 1977, 2 males, 6 females, D.

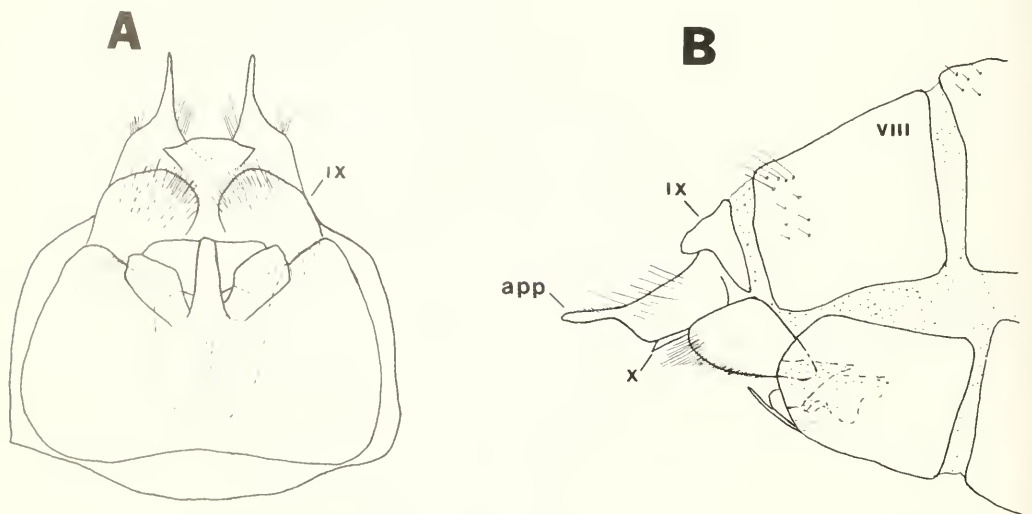


Fig. 2. Female genitalia: A, ventral view; B, lateral view, segments 8 to 10. app. = appendages of segment 10.

Ferrington, 6 August 1979, 57 males, 24 females, L. Brooks.

Limnephilus secludens Banks.— Colorado (Grand Co.): Winding River Campground, 2 August 1978, 1 female, collected D. Ferrington, identified A. Nimmo.

Neothremma alicia Banks.— Wyoming (Park Co.): Ghost Creek, 15 August 1974, 33 larvae, 6 pupae (1 pharate male, 5 pharate females), L. Ferrington; Sawtooth Lake, 23 July 1978, 4 larvae, 1 pharate male pupa, D. Ferrington.

Oligophlebodes zelti Nimmo.— Wyoming (Park Co.): Ghost Creek, 27 July 1978, 3 males, 3 females, collected L. Ferrington. Some variation exists between these and Alberta specimens (Nimmo, pers. Comm.). This species was previously known only from Alberta (Nimmo 1971).

Psychoglypha aff. subborealis Banks.— Wyoming (Park Co.): Beartooth Lake, 17 August 1977, 5 larvae, R. Seward. These larvae possess banded legs, as in *P. subborealis* (Wiggins 1977).

Lepidostomatidae

Lepidostoma pluviale Milne.— Wyoming (Teton Co.): Gross Ventre Campground, 29 July 1978, 8 males, 30 females, D. and L. Ferrington.

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